<name>
Class: Honors Geometry
Date: <date>
Topic: Lesson 9-1 (The Tangent Ratio)

Tangent Ratio

The tangent ratio for a given $\angle$ of a rt. Δ is the ratio of the opp. side to the adj. side.

$$\tan A = \frac{opposite}{adjacent}$$

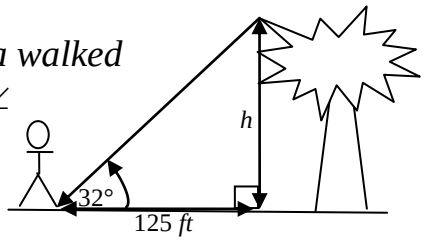
Example

Write the tangent ratios for $\angle A \text{ and } \angle B$.

$$\tan A = \frac{opp}{adj} = \frac{20}{21} \quad \& \quad \tan B = \frac{opp}{adj} = \frac{21}{20} \text{ (leave in fraction form)}$$

Example

To measure the height of a tree, Alma walked 125 ft fm the tree & measured a 32° $\angle$ fm the ground to the top of the tree. Estimate the height of the tree.



$$\tan 32 = \frac{h}{125} \text{ or } h = 125 \cdot \tan 32 = 78.108 \approx 78\, ft$$

Inverse Tangent

Way of determine angle measure given the tangent ratio.

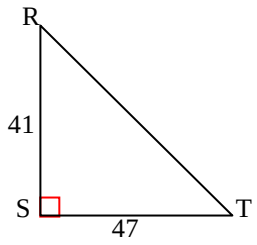
$$m\angle A = \tan^{-1}\left(\frac{opp}{adj}\right)$$

Example

Find $m\angle R$ to the nearest degree.

Opposite = 47
Adjacent = 41

$$m\angle R = \tan^{-1}\frac{47}{41} = 48.90\,.$$



Definition: Grade Proportion

How steep a road is: rise over run. Same as slope. Often a %.

Angle of a 10% grade $\rightarrow \tan^{-1}\left(\frac{10}{100}\right) = 5.7016 \approx 5.7°$

Questions

1. Without using a calculator, how would you find the angle whose tangent equals 1?

2. Without using a calculator, how would you find tan 60°?